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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/563,646	01/06/2006	Francesco Pessolano	NL030809	1901
65913	7590	01/18/2008		
NXP, B.V. NXP INTELLECTUAL PROPERTY DEPARTMENT M/S41-SJ 1109 MCKAY DRIVE SAN JOSE, CA 95131			EXAMINER PETRANEK, JACOB ANDREW	
			ART UNIT 2183	PAPER NUMBER
			NOTIFICATION DATE 01/18/2008	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ip.department.us@nxp.com

Office Action Summary	Application No. 10/563,646	Applicant(s) PESSOLANO, FRANCESCO	
	Examiner Jacob Petranek	Art Unit 2183	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 December 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 1/6/2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-8 are pending.
2. The office acknowledges the following papers:
Claims and arguments filed on 12/31/2007.
3. The indicated allowability of claims 1-5 and 8 from the pre-appeal conference results are withdrawn in view of the newly discovered reference(s) to Gochman et al. ("The Intel Pentium M Processor: Microarchitecture and Performance") and Wilkerson et al. (U.S. 7,143,272). Rejections based on the newly cited reference(s) follow.

Drawings

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the limitation from claim 7 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d).

Claim objections

5. Claims 1-7 are objected to for the following reasons:
6. Claims 1-7 are apparatus claims that should be changed to "An [[A]]apparatus" to fix a grammatical error.

New Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1 and 8 recite the limitation "the outcome" in line 1 of the claim. There is insufficient antecedent basis for this limitation in the claim.

9. Claims 1 and 8 recite the limitation "the occurrence" in line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim.

10. Claims 1 and 8 recite the limitation "the branch outcome" in line 5 of the claim. There is insufficient antecedent basis for this limitation in the claim.

11. Claim 4 recites the limitation "the current and previous branches" in lines 2-3 of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. §103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 1 and 8 are rejected under 35 U.S.C. §103(a) as being unpatentable over Gochman et al. ("The Intel Pentium M Processor: Microarchitecture and Performance").

14. As per claim 1:

Gochman disclosed an apparatus for predicting an outcome of a conditional branch within a computer system, the apparatus comprising means for identifying an

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occurrence of a conditional branch (Gochman: Figure 2, page 26 paragraph 1)(It's obvious to one of ordinary skill in the art that branches are detected so that they can be predicted according to the prediction methods of the Pentium M Processor.), means for obtaining data providing a measure of system activity since a previous branch (Gochman: Figure 2 element Count, page 26 paragraph 1)(The count value notes the number of times the branch is executed, which is the system activity since a previous branch.), means for comparing said data with data relating to previous system activity (Gochman: Figure 2 element Limit, page 26 paragraph 1)(The limit value represents previous system activity of a particular branch instruction. The comparator determines if the count has reached the predicted number of times the branch instruction is executed.), and means for predicting a branch outcome based on such comparison (Gochman: Figure 2 elements Limit and Prediction, page 26 paragraph 1)(The prediction value and limit value determine how the branch instruction is to be predicted and when the prediction is to end.).

15. As per claim 8:

The additional limitation(s) of claim 8 basically recite the additional limitation(s) of claim 1. Therefore, claim 8 is rejected for the same reason(s) as claim 1.

16. Claims 1-6 and 8 are rejected under 35 U.S.C. §103(a) as being unpatentable over Wilkerson et al. (U.S. 7,143,272).

17. As per claim 1:

Wilkerson disclosed an apparatus for predicting an outcome of a conditional branch within a computer system, the apparatus comprising means for identifying an occurrence of a conditional branch (Wilkerson: Figure 9 element 905, column 6 lines 59-66)(It's obvious to one of ordinary skill in the art that branches are detected so that they can be predicted via the lookup table.), means for obtaining data providing a measure of system activity since a previous branch (Wilkerson: Figure 9 element 905, column 5 lines 19-28 and column 6 lines 59-66)(The computation history for a branch instruction is drawn from the source operand. Its value is recursively generated from previous branch instructions.), means for comparing said data with data relating to previous system activity (Wilkerson: Figures 6 and 9 elements 230 and 915, column 6 lines 16-22)(Official notice is given that lookup tables can be arranged to have tags for insuring that the index does retrieve the correct data. Thus, it's obvious to one of ordinary skill in the art that element 230 contains a tag used to insure the correct branch prediction is retrieved when indexing into the lookup table.), and means for predicting the branch outcome based on such comparison (Wilkerson: Figure 9 element 925, column 6 lines 16-22)(The branch prediction is retrieved from the lookup table upon a hit in the lookup table.).

18. As per claim 2:

Wilkerson disclosed the apparatus according to claim 1, wherein the data relating to system activity comprises average system activity (Wilkerson: Figure 4 element 225, column 5 lines 19-28)(The computation history is a running average of previous computation histories.).

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19. As per claim 3:

Wilkerson disclosed the apparatus according to claim 1, wherein an activity history table is provided in which is stored data relating to previous system activity and the branch outcome to which such activity corresponded (Wilkerson: Figure 6 element 230, column 6 lines 16-22)(The lookup table stores branch predictions based on previous predictions.).

20. As per claim 4:

Wilkerson disclosed the apparatus according to claim 3, comprising means for, when a conditional branch is encountered, retrieving data relating the system activity between the current and previous branches (Wilkerson: Figure 9 element 905, column 6 lines 59-66)(For a branch instruction, the system activity is the computation history of a source operand of the branch instruction.), and means for comparing this data with the data contained in the activity history table (Wilkerson: Figures 6 and 9 elements 230 and 915, column 6 lines 16-22)(The lookup table is the activity history table. Official notice is given that lookup tables can be arranged to have tags for insuring that the index does retrieve the correct data. Thus, it's obvious to one of ordinary skill in the art that element 230 contains a tag used to insure the correct branch prediction is retrieved when indexing into the lookup table.), wherein said means for predicting the branch outcome selects the branch outcome which has associated therewith activity data which most closely resembles the current retrieved activity data (Wilkerson: Figure 9 element 925, column 6 lines 16-22)(The branch prediction is retrieved from the lookup table upon a hit in the lookup table. The hit is an exact match.).

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21. As per claim 5:

Wilkerson disclosed the apparatus according to claim 4, wherein the activity history table updated with the latest activity data and the selected branch outcome (Wilkerson: Figure 9 element 930, column 7 lines 4-6)(The lookup table is updated based on the branch outcome, which is the latest activity data.).

22. As per claim 6:

Wilkerson disclosed the apparatus according to claim 1, including means for predicting the outcome of a conditional branch using the outcome history of that branch (Wilkerson: Figure 9 element 925, column 6 lines 16-22)(The branch prediction is retrieved from the lookup table upon a hit in the lookup table.).

23. As per claim 8:

The additional limitation(s) of claim 8 basically recite the additional limitation(s) of claim 1. Therefore, claim 8 is rejected for the same reason(s) as claim 1.

24. Claim 7 is rejected under 35 U.S.C. §103(a) as being unpatentable over Wilkerson et al. (U.S. 7,143,272), in view of Chang et al. ("Improving branch prediction accuracy by reducing pattern history table interference").

25. As per claim 7:

Wilkerson disclosed the apparatus according to claim 6.

Wilkerson failed to teach wherein data relating to the activity of the system is only used for branch outcome prediction if the confidence of accuracy of branch outcome prediction using branch history is relatively low.

However, Chang disclosed wherein data relating to the activity of the system is only used for branch outcome prediction if the confidence of accuracy of branch outcome prediction using branch history is relatively low (Chang: Figure 5, section 4.1)(The combination results in the prediction system of Wilkerson being used by default and the BTB high confidence predictor of Chang being used to predict high-confidence branches.).

The advantage of using the two structure predictor of Chang is that it allows for reducing interference from branch history tables, which can also improve branch prediction performance (Chang: Section 4.1 paragraph 1). One of ordinary skill in the art would have been motivated by this advantage to implement the two-structure predictor of Chang into Wilkerson. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to implement the two-structure predictor of Chang into the processor of Wilkerson for the advantage of reducing interference in the lookup table and increasing branch prediction performance.

Conclusion

The following is text cited from 37 CFR 1.111(c): In amending in reply to a rejection of claims in an application or patent under reexamination, the applicant or patent owner must clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. The applicant or patent owner must also show how the amendments avoid such references or objections.


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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacob Petranek whose telephone number is 571-272-5988. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Chan can be reached on (571) 272-4162. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jacob Petranek
Examiner, Art Unit 2183



EDDIE CHAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100